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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/701,462	11/06/2003	Yoshiharu Ono	67161-127	8571

7590 07/26/2005

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Washington, DC 20005-3096

EXAMINER

CHEN, KIN CHAN

ART UNIT	PAPER NUMBER
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1765

DATE MAILED: 07/26/2005

Please find below and/or attached an Office communication concerning this application or proceeding.

## Office Action Summary

**Application No.**

10/701,462

**Applicant(s)**

ONO, YOSHIHARU

**Examiner**

Kin-Chan Chen

**Art Unit**

1765

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

### Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

### Status

- 1) ☐ Responsive to communication(s) filed on \_\_\_\_.
- 2a) ☐ This action is FINAL. 2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

### Disposition of Claims

- 4) ☒ Claim(s) 1-7 is/are pending in the application.
- 4a) Of the above claim(s) \_\_\_\_ is/are withdrawn from consideration.
- 5) ☐ Claim(s) \_\_\_\_ is/are allowed.
- 6) ☒ Claim(s) 1-7 is/are rejected.
- 7) ☐ Claim(s) \_\_\_\_ is/are objected to.
- 8) ☐ Claim(s) \_\_\_\_ are subject to restriction and/or election requirement.

### Application Papers

- 9) ☒ The specification is objected to by the Examiner.
- 10) ☒ The drawing(s) filed on 06 November 2003 is/are: a) ☐ accepted or b) ☒ objected to by the Examiner.  
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).  
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

### Priority under 35 U.S.C. § 119

- 12) ☒ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☒ All b) ☐ Some \* c) ☐ None of:
1. ☒ Certified copies of the priority documents have been received.
  2. ☐ Certified copies of the priority documents have been received in Application No. \_\_\_\_.
  3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

\* See the attached detailed Office action for a list of the certified copies not received.

### Attachment(s)

- |   |  |
|---|--|
| 1) <input checked="" type="checkbox"/> Notice of References Cited (PTO-892)   | 4) <input type="checkbox"/> Interview Summary (PTO-413)<br>Paper No(s)/Mail Date. ____ |
| 2) <input type="checkbox"/> Notice of Draftsperson's Patent Drawing Review (PTO-948)  | 5) <input type="checkbox"/> Notice of Informal Patent Application (PTO-152)            |
| 3) <input checked="" type="checkbox"/> Information Disclosure Statement(s) (PTO-1449 or PTO/SB/08)<br>Paper No(s)/Mail Date <u>110603</u> . | 6) <input type="checkbox"/> Other: ____  |

## **DETAILED ACTION**

### ***Specification***

1. The title of the invention is not descriptive. A new title is required that is clearly indicative of the invention to which the claims are directed.

In specification, page 5, "SiO" "SiOF" "SiOC" are required to have complete name of each material in the specification. Because, for example, there is no such material of "SiO".

Appropriate correction is required.

### ***Drawings***

2. Figure 15 should be designated by a legend such as --Prior Art-- because only that which is old is illustrated. See MPEP § 608.02(g). Corrected drawing sheets are required in reply to the Office action to avoid abandonment of the application. The replacement sheet(s) should be labeled "Replacement Sheet" in the page header (as per 37 CFR 1.84(c)) so as not to obstruct any portion of the drawing figures. If the changes are not accepted by the examiner, the applicant will be notified and informed of any required corrective action in the next Office action. The objection to the drawings will not be held in abeyance.

***Claim Rejections - 35 USC § 112***

3. Claims 1-7 are rejected under 35 U.S.C. 112, second paragraph, as being indefinite for failing to particularly point out and distinctly claim the subject matter which applicant regards as the invention.

In claim 1, "removing said filling material with a prescribed conductive material" is vague and indefinite. It is unclear how a prescribed conductive material is used for removing the filling material.

Claim 3 recites the limitation "the step of forming another insulating film" in lines 2-3. There is insufficient antecedent basis for this limitation in the claim.

***Claim Rejections - 35 USC § 103***

4. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

5. Claims 1-7 are rejected under 35 U.S.C. 103(a) as being unpatentable over Lin et al. (US 6,042,999; hereinafter "Lin") in view of Chen et al. (US 6,417,096; hereinafter "Chen").

In a method for semiconductor device fabrication, Lin teaches that a first conductive region may be formed on a main surface of a semiconductor substrate. An insulating film may be formed above the semiconductor substrate to cover the first conductive region. A first recess may be formed in the insulating film. The first recess may be filled with a filling material. A photoresist may be applied to the insulating film. A resist pattern may be formed such that the filling material may be revealed. The insulating film may be etched with the resist pattern as a mask to form a second recess, forming a recess portion defined by the first recess and the second recess revealing a surface of the first conductive region. The filling material may be removed. A second conductive region may be formed, by filling up the recess portion, to electrically connected to the first conductive region (col.5 and 6; Figs. 2a-2h).

Unlike the claimed invention, Lin does not teach that a wet treatment may be performed to the first recess by a resist solvent containing an acid component after forming the first recess in the insulating film. In a method for avoiding photo residue in dual damascene, Chen teaches that the via hole (so-called first recess in instant claims) may be treated with acid in order to avoid photo residue on the dual damascene process (abstract; col. 1, lines 6-10). Hence, it would have been obvious to one with ordinary skill in the art to perform acid treatment to the via hole (so-called first recess in instant claims) as taught by Chen in the process of Lin in order to avoid photo residue on the dual damascene process.

As to dependent claim 3, Lin teaches using various materials for lower and upper dielectric layers (col. 5, lines 1-5), thus making the limitations of the claim obvious.

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The above cited claims differ from the combined prior art by specifying well-known features (such as those in claims 4, 6, and 7) to the art of semiconductor device fabrication, the examiner takes official notice. It is the examiner's position that a person having ordinary skill in the art at the time of the claimed invention would have found it obvious to modify the combined prior art by adding any of same well-known features to same in order to meet the specific product requirement.

6. Claims 1-7 are rejected under 35 U.S.C. 103(a) as being unpatentable over Lin et al. (US 6,042,999; hereinafter "Lin") in view of Wu et al. (US 6,733,597; hereinafter "Wu").

In a method for semiconductor device fabrication, Lin teaches that a first conductive region may be formed on a main surface of a semiconductor substrate. An insulating film may be formed above the semiconductor substrate to cover the first conductive region. A first recess may be formed in the insulating film. The first recess may be filled with a filling material. A photoresist may be applied to the insulating film. A resist pattern may be formed such that the filling material may be revealed. The insulating film may be etched with the resist pattern as a mask to form a second recess, forming a recess portion defined by the first recess and the second recess revealing a surface of the first conductive region. The filling material may be removed. A second conductive region may be formed, by filling up the recess portion, to electrically connect to the first conductive region (col.5 and 6; Figs. 2a-2h).

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Unlike the claimed invention, Lin does not teach that a wet treatment may be performed to the first recess by a resist solvent containing an acid component after forming the first recess in the insulating film. In a method for cleaning a dual damascene structure, Wu teaches that the via hole may be treated (cleaned) with acid in order to reduce the via resistance (abstract; Fig. 3). Hence, it would have been obvious to one with ordinary skill in the art to perform acid treatment (cleaning) to the via hole as taught by Wu in the process of Lin in order to reduce the via resistance.

As to dependent claim 3, Lin teaches using various materials for lower and upper dielectric layers (col. 5, lines 1-5), thus making the limitations of the claim obvious.

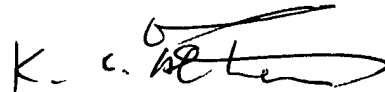
The above-cited claims differ from the combined prior art by specifying well-known features (such as those in claims 4, 6, and 7) to the art of semiconductor device fabrication, the examiner takes official notice. It is the examiner's position that a person having ordinary skill in the art at the time of the claimed invention would have found it obvious to modify the combined prior art by adding any of same well-known features to same in order to meet the specific product requirement.

7. Any inquiry concerning this communication or earlier communications from the examiner should be directed to Kin-Chan Chen whose telephone number is (571) 272-1461. If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Nadine Norton can be reached on (571) 272-1465. The fax phone number for the organization where this application or proceeding is assigned is 703-872-9306. Information regarding the status of an application may be obtained from the Patent

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Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free).

*July 22, 2005*



Kin-Chan Chen  
Primary Examiner  
Art Unit 1765

K-C C